



# **Enterprise Portal Interoperability Architecture**

## **System Architecture Document**

### **Construction Phase**

#### **Version 5.0**

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## Revision History

Date	Version	Description	Author
11/12/02	1.0	Document Creation	Grant Holland
11/13/02	1.0.1	Todd's Architecture Overview	Grant Holland
11/18/02	1.0.2	Added component descriptions to Overview	Grant Holland
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12/04/02	2.0	Prepared final version and released for customer review	Julie Simon
12/04/02	2.1	Added Search Manager to Upper Platform, added Nuance and modified use cases based on feedback from Jan Sorensen	Todd Lasseigne
12/06/02	3.0	Released for customer review	Julie Simon
12/11/02	3.1	Added Configuration View	Todd Lasseigne
12/11/02	4.0	Released for customer review	Danice Johnson
12/17/02	4.1	Made following changes based on Jan Sorensen feedback: <ul style="list-style-type: none"> <li>• Changed Software to System in 2 places</li> <li>• Search1: removed CMS Manager</li> <li>• Search 2B: findContentAndService renamed to findWebService</li> <li>• SSO: moved performService to point to Web Browser</li> </ul>	Todd Lasseigne
12/17/02	5.0	Released for customer review	Danice Johnson

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## Introduction

This document describes the system architecture of the Georgia Enterprise Portal Interoperability Architecture (EPIA) that will allow constituents of the State of Georgia to access state information and services. The architecture will also provide a consistent mechanism for the information systems of Agencies of the State of Georgia to interoperate with the Enterprise Portal, as well as with each other.

The previous System Architecture Document – Elaboration Phase, which provided an abstract and general architecture for the EPIA, prescribed a particular set of technologies and component relationships that could be realized and implemented in a variety of ways.

This System Architecture Document – Construction Phase describes the specific implementation of a subset of the architecture, as presented in the Elaboration Phase document, and as implemented at GTA during the calendar year 2002.

## Purpose

This document is the primary architectural description of the Enterprise Portal Interoperability Architecture (EPIA). It includes the structure and behavior of the system that impacts the architectural requirements as specified in the Requirements Document. It also explains the decisions that were made and describes the way the system has been designed to handle evolution over time.

As such, this document is intended to provide the primary blueprint that will be used by application developers and integrators when designing, constructing, and testing the Enterprise Portal. Further, this document is for use by GTA and other State Agency personnel as they deploy applications into the EPIA.

## Scope

The goal of the EPIA project is to provide the State of Georgia with a software interface tool for providing new and existing online services to the constituents of the State of Georgia. The scope of the project does not include enhancements or conversions of existing legacy applications. The portal architecture will provide a model for integrating new and existing services into a 'branded' public gateway interface that represents the State of Georgia.

## Definitions, Acronyms, and Abbreviations

Refer to the Project Glossary for a full description of all terms, acronyms, and abbreviations referenced in this document.

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## References

This document was developed in accordance with the SunTone Architecture Methodology.

Further, several architectural scenarios were identified to describe specific behavior of the architecture and this document references those scenarios. Finally, the Security Model architecture was developed for the EPIA.

The architectural scenarios, as well as respective documentation, are listed below:

- End-to-End Scenario
  - End-to-End Requirements and Design Document
  - End-to-End Test and Acceptance Document
- Logging Scenario
  - Logging Requirements Document
  - Logging Design Document
  - Logging Test and Acceptance Document
- Natural Language Search Scenario
  - Natural Language Search Requirements Document
  - Natural Language Search Design Document
  - Natural Language Search Test and Acceptance Document
  - Natural Language Search Installation Guide
- Document Exchange Scenario
  - Document Exchange Requirements Document
  - Document Exchange Prototype Guide (replaces the Design Document)
  - Document Exchange Test and Acceptance Document
- Personalization Scenario
  - Personalization Requirements Document
  - Personalization Design Document
  - Personalization Test and Acceptance Document
- Security Model
  - Application Security Architecture Document

All of these documents are available in the document repository (<http://epia.gagta.com>) (within the EPIA Release 2/Scenario Documentation directory).

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## **EPIA Architecture Overview**

### **Distributed Platform Overview**

The Distributed Platform Overview identifies all major components of the EPIA portal architecture.

The major organization of the architecture into tiers and layers is presented and the distribution of major architectural components across tiers and layers is defined.

The remainder of this document provides details regarding these components, how they interact to satisfy EPIA requirements, and how they provide the qualities of service necessary for the EPIA portal.

The Distributed Platform is shown in the illustration that follows. Further, the tiers and layers that provide the organizational structure of the architecture are described. Finally, each component is described, as organized by tier and layer.

### **Architectural Organization**

The EPIA Architecture Distributed Platform Overview is organized based on a two-dimensional grid. These two dimensions are referred to as Tiers and Layers.

The horizontal dimension contains the Tiers, which organize the architecture according to client/server relationships. The vertical dimension contains the Layers, which organize the architecture according to levels of abstraction.

The resulting grid contains a number of cells, each residing within a particular position on the horizontal-vertical plane. The general functions of each cell within the architecture can be understood by the position of the cell within the plane. Further, the architectural components within the cell operate to perform the general function of the cell.

The following sections provide more detail regarding the dimensions (Tiers and Layers) of the EPIA Distributed Platform Architecture.

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## Tiers

Based on the concept of the “three-tier architecture”, the Distributed Platform Architecture for the EPIA contains two additional tiers that were added to accommodate the following considerations:

- The influence of the world wide web on presentation
- The complexities of the modern enterprise data center

Accordingly, the five tiers, which organize the architecture according to client/server relationships, are as follows:

<b>Tier</b>	<b>Description</b>	<b>Typical Component</b>
Portal Client	User interface components, standalone applications, or application components that require service from remote components in other tiers.	Web Browser
Presentation	Components that consolidate content into a presentation that can be delivered as markup language over the Web to the Portal Client Tier.	Servlets, JSPs
Business Logic	Java components that contain the primary business logic of a service. These may delegate to EIS Tier components for certain sub-services	Enterprise JavaBean Components, Vignette
Integration	Mechanisms that assist in communications with Enterprise Tier resources components.	Connectors, Adaptors
EIS	Existing or legacy enterprise applications or data that resides outside of the platform technology (Java) that implements the Business Logic Tier	Oracle, CICS, IMS, SAP

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## Layers

Layers organize the architecture according to levels of abstraction. The lowest level is typically implemented in the hardware, while the other levels are implemented in the software.

Further, the layers that address an increasing level of abstraction generally present a higher level of metaphor than the previous layers, and they generally invoke the capabilities of lower layers to carry out their implied capabilities.

Accordingly, the five layers are as follows:

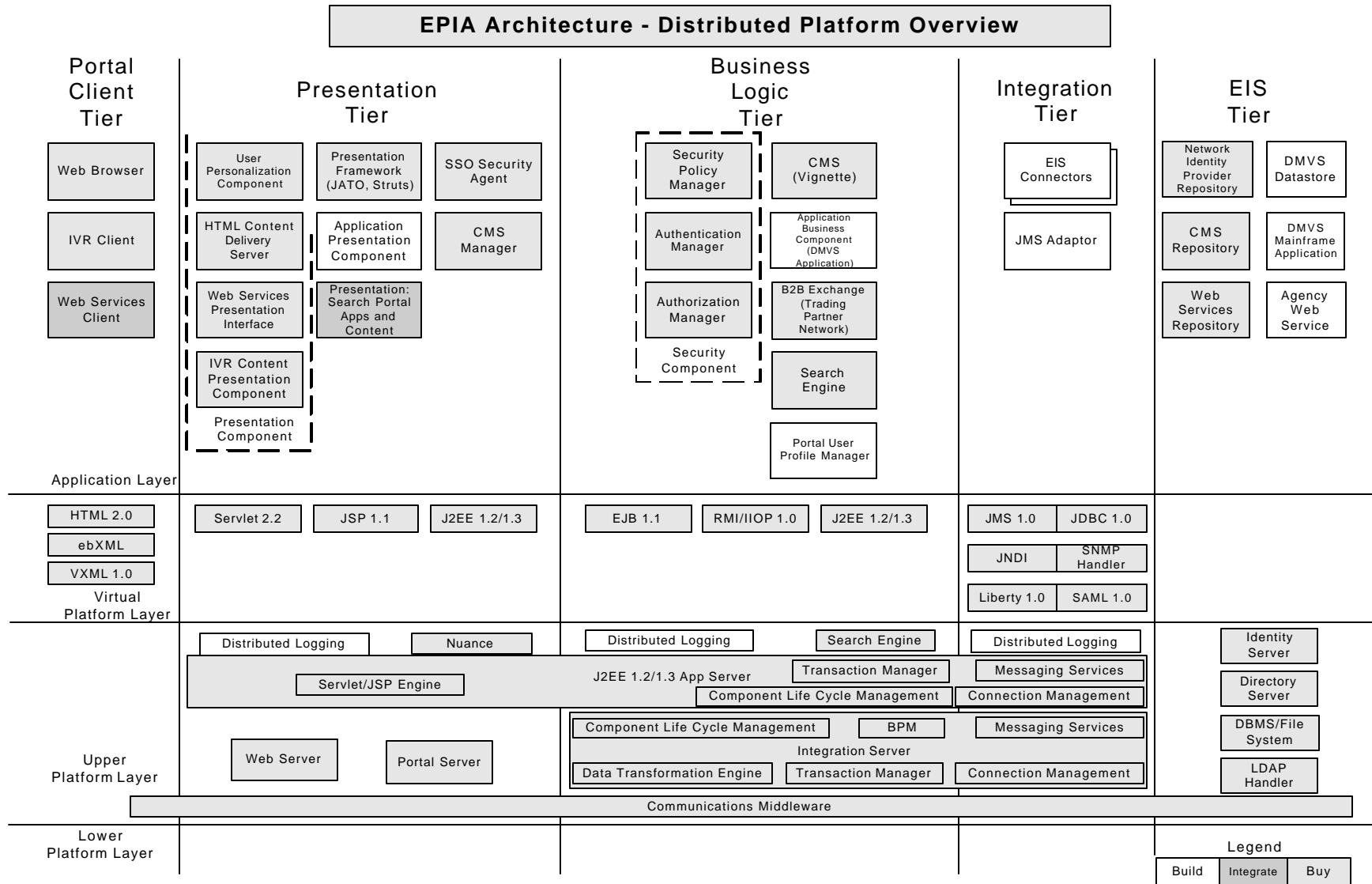
Layer	Description	Typical Component
Application	Business logic components, which may be purchased (“COTs”) or developed from scratch.	DMVS Application Components
Virtual Platform	Industry standard APIs, which are not actual components, but rather programming interface specifications that are used by components in the Upper Platform layer to expose their capabilities to components in the Application Layer.	Servlet Specification, JSP Specification, EJB Specification, SOAP Specification
Upper Platform	Run-time components and mechanisms that are commonly utilized across the application. This is “system software” that resides above the OS kernel level.	Web Servers, Application Servers, DBMSs, Directory Servers
Lower Platform	The supporting software infrastructure.	Operating Systems, Networking Stacks
Hardware	The actual physical hardware, including CPUs, memory, disk arrays, and physical networks.	Sun Fire 6800, 220R

## EPIA Architecture – Distributed Platform Overview

The EPIA Architecture – Distributed Platform Overview is shown in the illustration that follows.



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## Architectural Components

Each component within the Distributed Platform Overview is described in the tables that follow.

### Application Layer

#### Portal Client Tier Components

Construction SAD	Description	Elaboration SAD
<b>BPM Developer Client</b>	Tool that enables BSOs to assemble and modify business processes.	< None >
<b>IVR Client</b>	Human user interface device for interacting with applications in a digital manner.  This is usually done with a phone device.	Multiple Client Device
<b>Web Browser</b>	Interface device (based on HTTP and HTML technologies) that enables human users to browse the world wide web.	Multiple Client Device
<b>Web Services Client</b>	Application that invokes a Web service component.  The Web Service Presentation Interface in the Presentation tier intercepts the invocation and forwards the invocation to the Web service implementation, which is implemented in the Business Logic Tier.	Web Services Client

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### Presentation Tier Components

Construction SAD	Description	Elaboration SAD
<b>Application Presentation Component</b>	<p>Presentation component of an application.</p> <p>This component interacts with the business logic in the same manner as the IVR Content Presentation, except that it delivers HTML to the end user (instead of VXML).</p>	App Component
<b>CMS Manager</b>	<p>UI component for the CMS Manager (Vignette) in the Business Logic tier.</p> <p>Intercepts local calls to the CMS Manager.</p> <p>Delivers presentation components to content administrators (not end users).</p>	CMS Manager
<b>HTML Content Delivery Server</b>	<p>Responsible for static content delivery (Georgia.gov).</p> <p>Non-programmers maintain the content, and the Content Delivery Server (CDS) delivers the required content to the end user.</p>	Multi-Device Manager
<b>IVR Content Presentation</b>	<p>This component takes responses from the business logic and converts them into VXML to render to the end user.</p> <p>It interacts with the business logic in the same manner as the Application Presentation Component.</p>	Multi-Device Manager
<b>Presentation Framework</b>	<p>Programming framework for use by applications.</p> <p>This framework assists application in developing Web presentations.</p> <p>The portal infrastructure recommends a Model View Controller (MVC) or a Model II design for application.</p> <p>It should be noted that JATO or Struts are both acceptable for application development.</p>	Presentation Framework
<b>Presentation: Search Portal Apps and Content</b>	<p>Provides a user interface for searching for Portal applications or Portal content and for presenting search results.</p>	Presentation: Search Portal Apps and Content

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Construction SAD	Description	Elaboration SAD
<b>SSO Security Agent</b>	<p>Responsible for managing all access to external and internal components.</p> <p>This will intercept requests to the portal infrastructure and ensure that the user (human or computer) has the appropriate access prior to allowing access.</p> <p>This agent will serve as the primary software defense services for the portal infrastructure for managing access to applications and services.</p>	Single Sign On (SSO)
<b>User Personalization Component</b>	<p>Mechanism by which a portal user can customize his/her experience of using the Portal.</p> <p>Customizable parameters could include homepage layout and content channel preferences.</p>	User Personalization Manager
<b>Web Services Presentation Interface</b>	Remote interface and entry point for Web service invocations.	Front Controller

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### Business Logic Tier Components

Construction SAD	Description	Elaboration SAD
<b>Application Business Component (DMVS Application)</b>	<p>Contains the Portal business logic for the DMVS application.</p> <p>The Application Presentation Component and the IVR Presentation Component are examples of the types of presentation components that would interact with this.</p> <p>Each application should have it's own Application Business Component.</p>	Application Component
<b>Authentication Manager (with Signature Validation)</b>	<p>Contains the business logic to manage all authentication issues for the Portal and portal applications.</p> <p>Delegated to by the Security Policy Manager.</p> <p>Will also determine user current Level of Confidence (see Security Model document for further description).</p>	Authentication
<b>Authorization Manager</b>	<p>Contains the business logic to manage all authorization issues for the Portal and portal applications.</p> <p>Delegated to by the Security Policy Manager.</p> <p>Authorization will only occur at a Portal level.</p> <p>A second level of authorization may also be done at the agency level, assuming that they participate in the security model outlined in the Security Document.</p>	Authorization
<b>CMS (Vignette)</b>	<p>Contains the business logic to manage portal content.</p> <p>Also responsible for managing/scheduling content pushes and updates to the end user.</p>	CMS (Vignette)
<b>Portal User Profile Manager</b>	<p>The component is written for the portal server and it allows users to customize their user preferences for the GTA portal.</p> <p>This component is also responsible for interacting with Vignette to propagate changes made by users.</p>	< None >

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Construction SAD	Description	Elaboration SAD
<b>Search Engine</b>	General Web search engine.  Can be used by other components for search capabilities.  Specifically, used by the Presentation tier to search for Portal applications and content.	Search Engine
<b>Security Policy Manager</b>	Manages all security policies for Portal users.  Manages Authentication, Authorization, and SSO.	< None >

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### Integration Tier Components

Construction SAD	Description	Elaboration SAD
<b>EIS Connectors</b>	<p>These components bridge between Java technology in the Portal and non-Java technologies in the EIS tier.</p> <p>Both the SunONE Application Server and the webMethods Integration Server products provide these connectors as add-on components.</p>	Connectors
<b>JMS Adaptor</b>	<p>This component enables an application to use the Java Message Service (JMS), even though the application does not have the ability to interact with the JMS system directly.</p> <p>Both the Application Server and the Integration Server are JMS systems.</p>	< None >

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### EIS Tier Components

Construction SAD	Description	Elaboration SAD
<b>Agency Web Service</b>	Application that resides on an agency's computer system and that exposes its access via Web Service technologies, such as WSDL, UDDI, and SOAP.	Web Services Implementation Wrapping
<b>CMS Repository</b>	Contains static portal content that enables the portal to provide customization capabilities.	CMS Repository
<b>DMVS Datastore</b>	The DVMS database, which is an Oracle database.	App Component
<b>DMVS Mainframe Application</b>	The DMVS CICS application.  This application resides on the agency's mainframe.	App Component
<b>Network Identity Provider Repository</b>	Manages and maintains all of the identification information for a user, as well as other application access policies to participate in the SSO Model (circle of trust).  Together this information makes up the policy information for a given user.	MED
<b>Web Services Repository</b>	Contains entries for Portal Web Services components.  These entries contain pointers the Web services components and describe the remote client interfaces to those components.	Web Services I/F Repository



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## Virtual Platform Layer

### Portal Client Tier Components

Construction SAD	Description	Elaboration SAD
<b>EbXML</b>	Electronic Business XML standard (OASIS).	EbXML
<b>HTML 2.0</b>	Hypertext Markup Language standard (W3C).	HTML 2.0
<b>VXML 1.0</b>	Voice XML.	< None >

### Presentation Tier Components

Construction SAD	Description	Elaboration SAD
<b>JSP 1.1</b>	Java Server Pages Web components standard (JCP).	JSP 1.1
<b>J2EE 1.2 and 1.3</b>	Java 2, Enterprise Edition, Java enterprise systems architecture for application servers (JCP)  Note: In December, iAS 7 will be installed. This supports J2EE 1.3	J2EE 1.2
<b>Servlets 2.2</b>	Java Web components standard (Java Community Process (JCP)).	Servlets 2.2

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### Business Logic Tier Components

Construction SAD	Description	Elaboration SAD
<b>EJB 1.1</b>	Enterprise JavaBeans technology for server-side Java components (JCP).	EJB 1.1
<b>J2EE 1.2 and 1.3</b>	Java 2, Enterprise Edition, Java enterprise systems architecture for application servers (JCP).  Note: In December, iAS 7 will be installed. This supports J2EE 1.3.	J2EE 1.2
<b>RMI-IIOP 1.0</b>	Communication middleware that integrates Java RMI programming interface with the CORBA IIOP wire protocol.  Allows JavaRMI apps to communicate with CORBA applications, as well as with each other, from disparate application servers.	RMI-IIOP 1.0

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### Integration Tier Components

Construction SAD	Description	Elaboration SAD
<b>JDBC 2.0</b>	Java Data Base Connectivity. A standard Java API for relational database drivers.	JDBC 2.0
<b>JMS 1.0</b>	Java Message Service. A standard Java API for Message-Oriented Middleware products.	JMS 1.0
<b>JNDI</b>	Java Naming and Directory Interface. A standard Java API for directory servers.	JNDI
<b>Liberty 1.0</b>	An open federated identity platform that enables users to link their accounts with various disparate identity providers.  It also enables the exchange of authentication information between organizations without revealing every aspect of identity for a given user to all agencies.	< None >
<b>SAML 1.0</b>	Security Assertion Markup Language. Refer to the Application Security Architecture Document.	< None >
<b>SNMP Handler</b>	Simple Network Management protocol handler.  Allows Portal application to behave as SNMP protocol agents.  This enables Portal applications to send messages and alerts via the standard protocol.	SNMP Handler

### EIS Tier Components

Construction SAD	Description	Elaboration SAD
< none >		

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## Upper Platform Layer

### Portal Client Tier Components

Construction SAD	Description	Elaboration SAD
<b>Communication Middleware</b>	System software that facilitates inter-application communication via a variety of interaction styles and patterns.	Communication Middleware

### Presentation Tier Components

Construction SAD	Description	Elaboration SAD
<b>Distributed Logging</b>	A component that enables applications to make entries to a unified logging mechanism from anywhere on the Portal network.	< None >
<b>J2EE 1.2 and 1.3 Application Server</b>	An enterprise server platform that connects human and programmatic users to Portal applications and to content and that integrates these with State Agency legacy systems and databases.  Note: In December, iAS 7 will be installed. This supports J2EE 1.3	J2EE 1.2 Application Server
<b>Portal Server</b>	Provides a mechanism for users to connect to the Portal system, to customize and personalized their experience with the Portal, and to access Agency applications and content that are registered with the Portal.	Portal Server
<b>Servlet/JSP Engine</b>	A subsystem of the J2EE 1.2 and 1.3 Application Server that manages the interface between Web users and the Portal infrastructure.  Note: In December, iAS 7 will be installed. This supports J2EE 1.3.	< None >
<b>Web Server</b>	Provides access to the Portal system from the WWW via the HTTP protocol.	Web Server
<b>Nuance</b>	Speech recognition software	None

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### Business Logic Tier Components

Construction SAD	Description	Elaboration SAD
<b>BPM</b>	A subsystem of the Integration Server that controls Business Process Management.	Int. Server: BPM
<b>Data Transformation Engine</b>	A subsystem of the Integration Server that transforms data between well-defined formats.	Int. Server: Data Transformation Engine
<b>Distributed Logging</b>	A component that enables applications to make entries to a unified logging mechanism from anywhere on the Portal network.	Distributed Logging
<b>Component Life Cycle Management</b>	A subsystem of the J2EE 1.2 and 1.3 Application Server that manages the runtime aspects of creation, execution, shared usage and deletion of application components within the Portal environment.	App Server: Component Life Cycle Management
<b>Component Life Cycle Management</b>	A subsystem of the Integration Server that manages the runtime aspects of creation, execution, shared usage and deletion of application components within the Portal environment.	Int. Server: Component Life Cycle Management
<b>Integration Server</b>	An enterprise server platform that integrates to Portal applications and content with State Agency legacy systems and databases.	Integration Server
<b>J2EE 1.2 and 1.3 Application Server</b>	An enterprise server platform that connects human and programmatic users to Portal applications and to content and that integrates these with State Agency legacy systems and databases.  Note: In December, iAS 7 will be installed. This supports J2EE 1.3.	J2EE 1.2 Application Server
<b>Transaction Mgr</b>	A subsystem of the J2EE 1.2 and 1.3 Application Server that manages distributed transactions.  This capability provides for all-or-none semantics when processing a transaction – and thus assures against the partial execution of business transactions.	App Server: Transaction Mgr

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Construction SAD	Description	Elaboration SAD
<b>Transaction Mgr</b>	<p>A subsystem of the Integration Server that manages distributed transactions.</p> <p>This capability provides for all-or-none semantics when processing a transaction, and thus assures against the partial execution of business transactions.</p>	Int. Server: Transaction Mgr
<b>Search Engine</b>	Search engine.	None

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### Integration Tier Components

Construction SAD	Description	Elaboration SAD
<b>Connection Management</b>	A subsystem of the J2EE 1.2 and 1.3 Application Server that provides adaptation functions in order to bridge between the Java technology of the Application Server and the legacy technology of a specific EIS tier application.	App Server: Connection Management
<b>Connection Management</b>	A subsystem of the Integration Server that provides adaptation functions in order to bridge between the Java technology of the Application Server and the legacy technology of a specific EIS tier application.	Int. Server: Connection Management
<b>Distributed Logging</b>	A component that enables applications to make entries to a unified logging mechanism from anywhere on the Portal network.	Distributed Logging
<b>Integration Server</b>	An enterprise server platform that integrates to Portal applications and content with State Agency legacy systems and databases.	Integration Server
<b>J2EE 1.2 and 1.3 Application Server</b>	An enterprise server platform that connects human and programmatic users to Portal applications and to content and that integrates these with State Agency legacy systems and databases.  Note: iAS 7 will be installed. This supports J2EE 1.3.	J2EE 1.2 Application Server
<b>Messaging Services</b>	A subsystem of the J2EE 1.2 and 1.3 Application Server that provides messaging-style inter-application communication.  Two styles are supported: 1) message queuing and 2) publish and subscribe (pub/sub).  The Java Message Service (JMS) API standard is supported by this service.	App Server: Messaging Service

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Construction SAD	Description	Elaboration SAD
<b>Messaging Services</b>	<p>A subsystem of the Integration Server that provides messaging-style inter-application communication.</p> <p>Two styles are supported: 1) message queuing and 2) publish and subscribe (pub/sub).</p> <p>The Java Message Service (JMS) API standard is supported by this service.</p>	Int. Server: Messaging Service

#### EIS Tier Components

Construction SAD	Description	Elaboration SAD
<b>DBMS/File System</b>	A Relational or Hierarchical database management system or a file system that is supported by an operating system.	DBMS/File System
<b>Directory Server</b>	A hierarchical system for managing data, and that is optimized for reading.	Directory Server
<b>Identity Server</b>	A server that manages identities and enforces authorized access to network services and resources.	< None >
<b>LDAP Handler</b>	<p>A protocol handler for the Lightweight Directory Access protocol. (LDAP).</p> <p>LDAP is a protocol that is designed for accessing directory services.</p>	LDAP Handler

#### Lower Platform Layer

Construction SAD	Description	Elaboration SAD
< none >		



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## Application Layer

The Application Layer combines the user and business functionality of a system on a middleware substrate. This layer is responsible for making a system unique.

### Behavior View

The SunTone Architecture Methodology defines several Application Layer views. However, this document presents a single view, the Behavior View, which depicts the interaction of the architectural components whenever an actor (user) actually uses the system. The Behavior View describes the dynamic behavior of the architecture, and all of its components, at real time when the system is in use.

Accordingly, a UML Sequence Diagram is provided to illustrate the component interactions as the 12 Use Cases are executed. The twelve Use Cases that are presented are a subset of the 16 project Use Cases as supported in the existing implementation of the EPIA.

Many of these Use Cases repeat the actions of the use case named “SSO”. In order to reduce complexity and repetition, the SSO Use Case will be represented as a component within certain Sequence Diagrams. So, when the SSO Use Case “component” is encountered, it represents all of the actions of the SSO Use Case. For more detailed discussion of the SSO use cases refer the security architecture document.

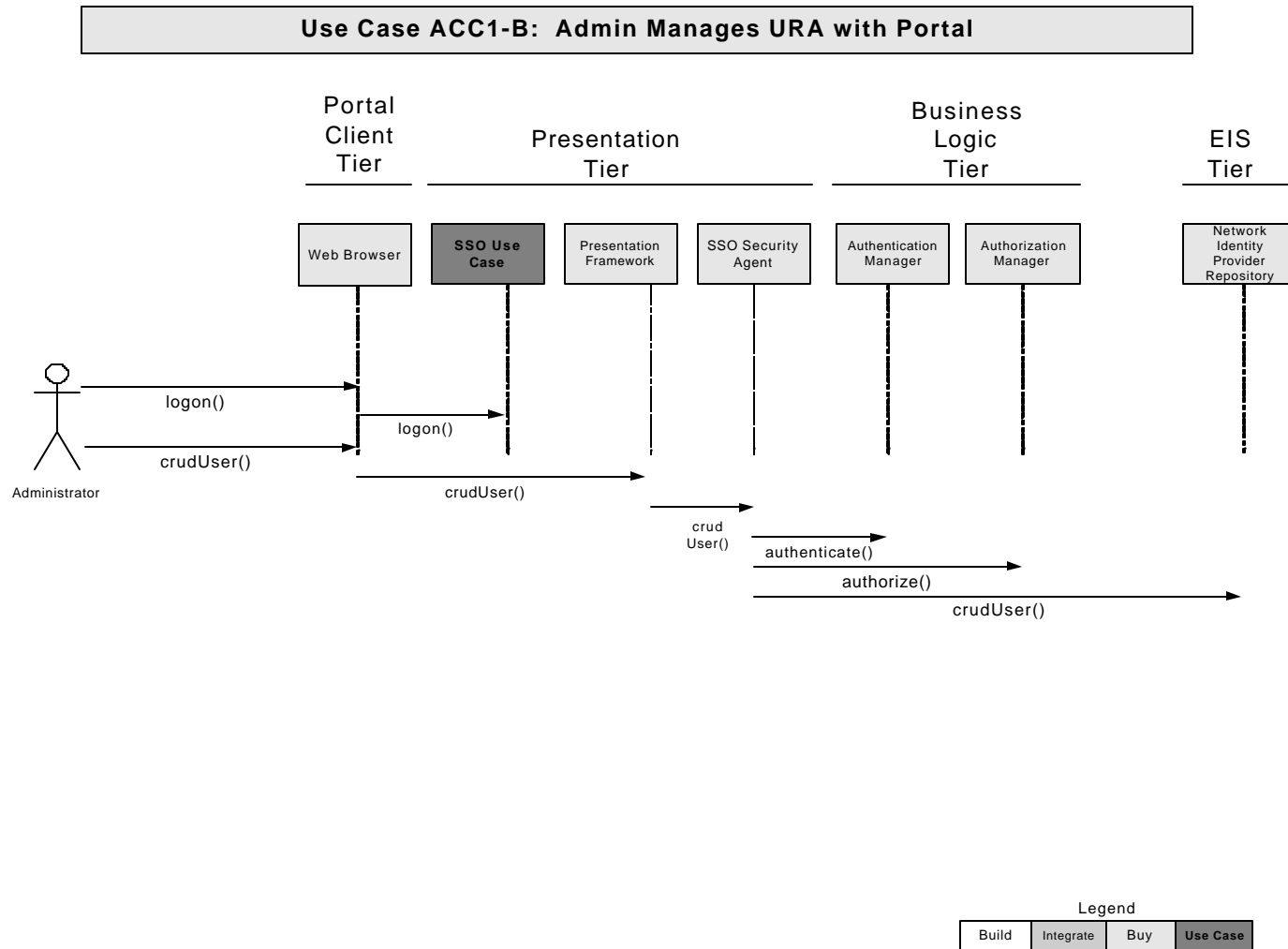
The majority of the components reside in the Application Layer. However, some components may reside in a lower layer of the architecture.

When the presentation framework component is used, it is important to note that many of the products (such as identity server and integration server) have graphical components. This component is simply used as a placeholder in the sequence diagram to refer to a presentation framework, which may not be Struts or JATO; rather, it refers to the presentation framework that is packaged with the COTS product.

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## ACC1-B

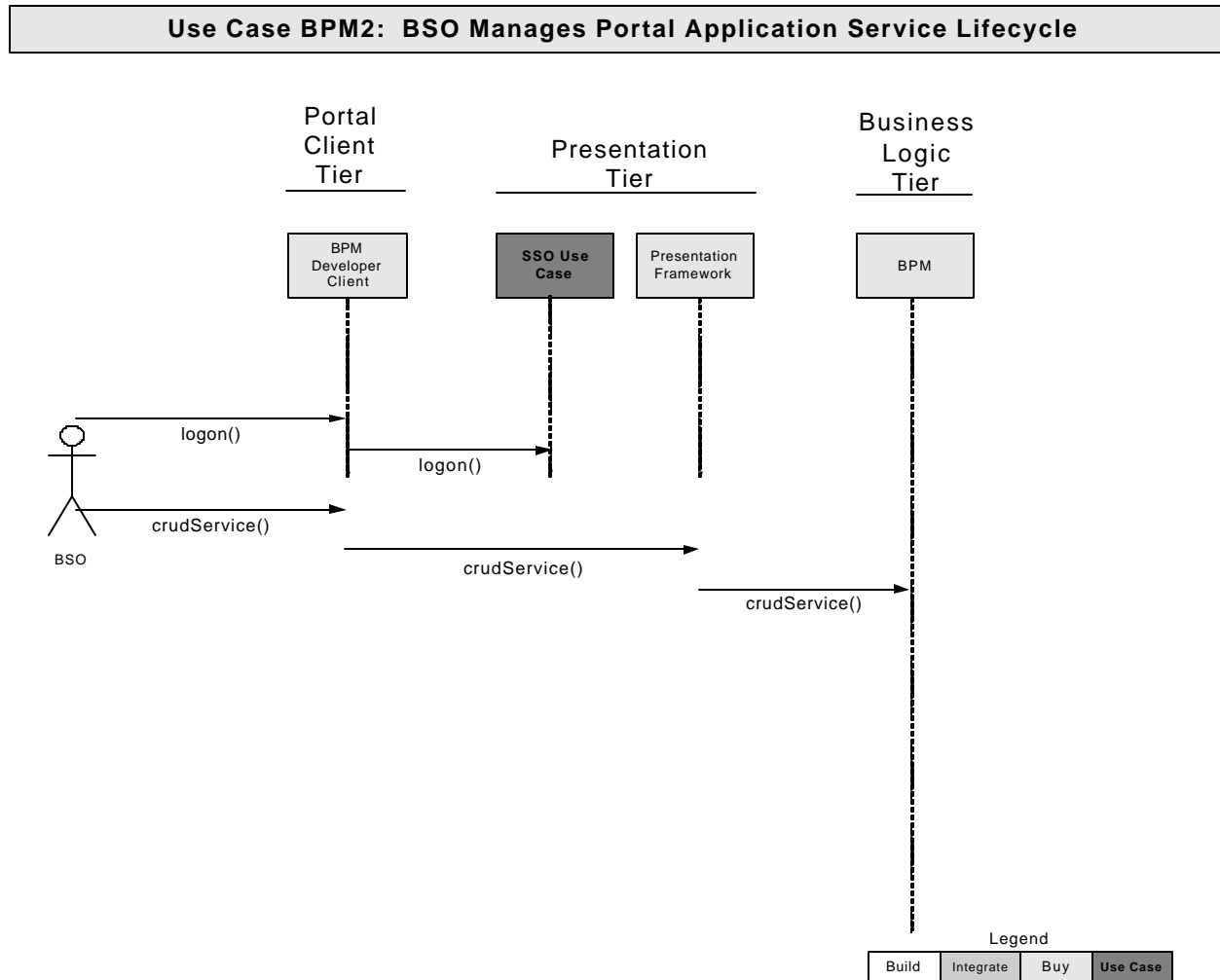
The ACC1-B Use Case is shown in the illustration that follows.



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## BPM2

The BPM2 Use Case is shown in the illustration that follows.

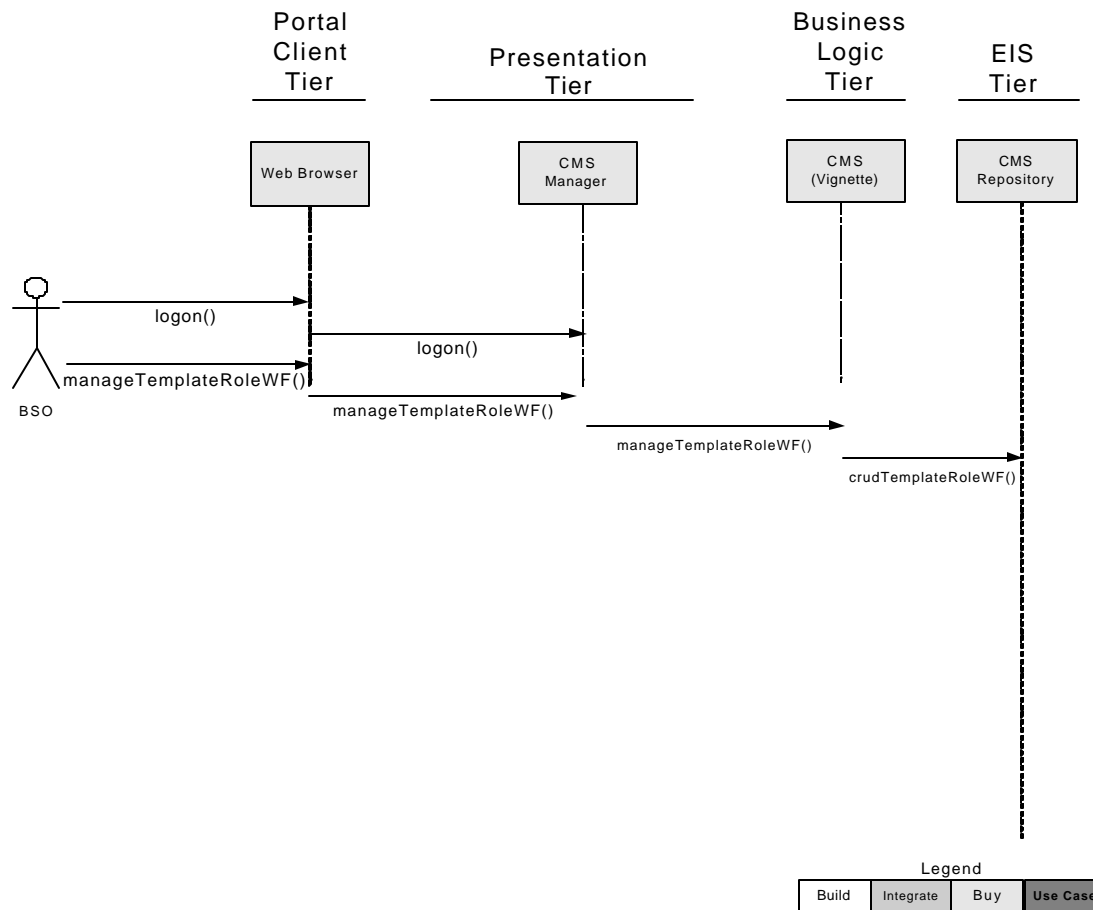


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## CONT1

The CONT1 Use Case is shown in the illustration that follows.

### Use Case CONT1: BSO Defines Content Workflow

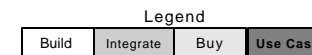
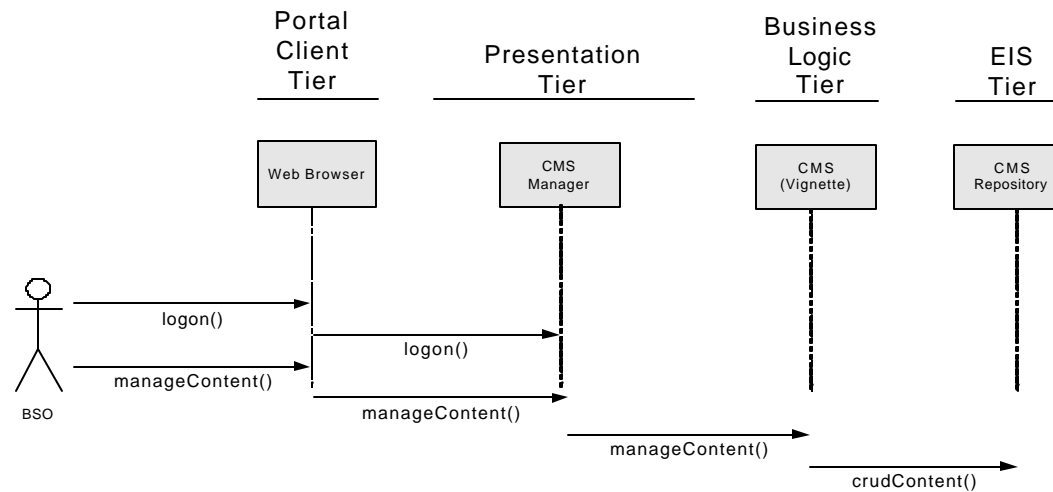


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## CONT6

The CONT6 Use Case is shown in the illustration that follows.

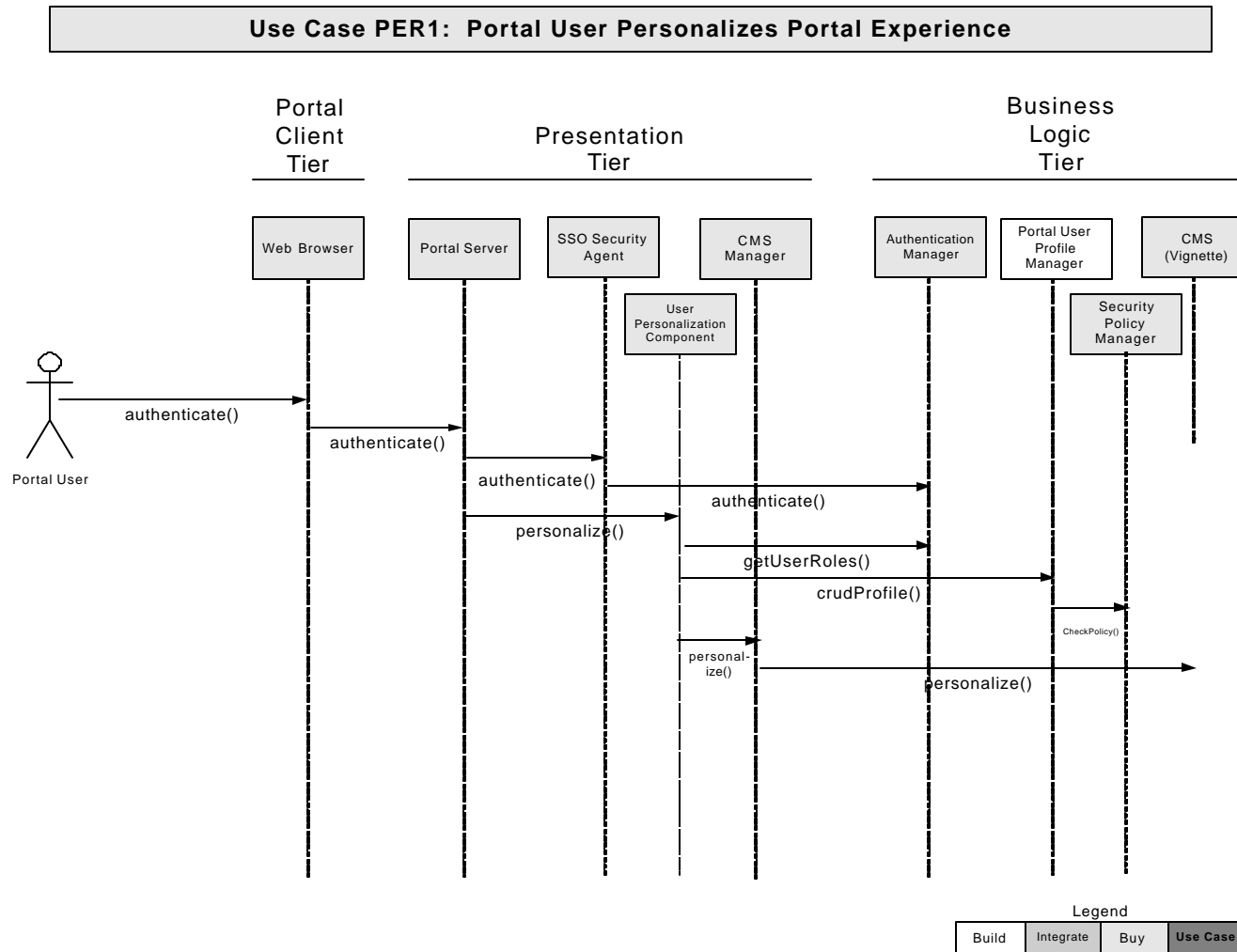
### Use Case CONT6: BSO Publishes and Maintains Portal Content



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## PER1

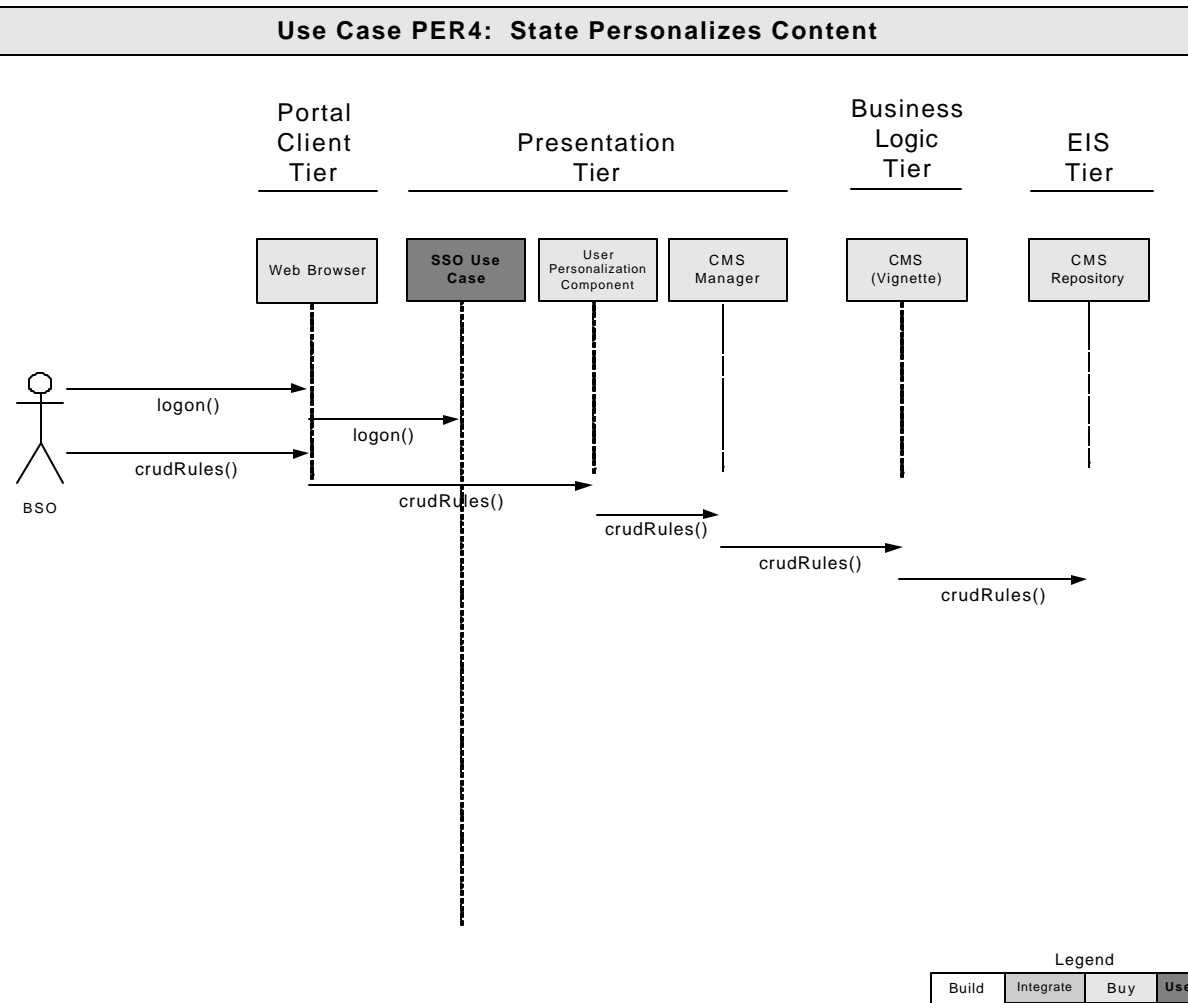
The PER1 Use Case is shown in the illustration that follows.



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## PER4

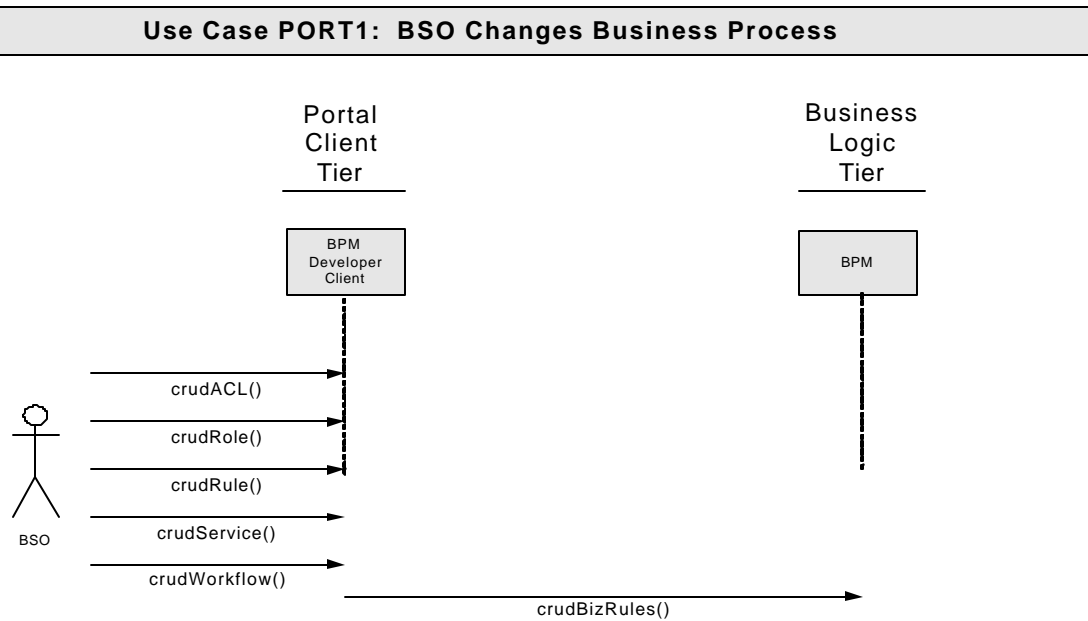
The PER4 Use Case is shown in the illustration that follows.



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## PORT1

The PORT1 Use Case is shown in the illustration that follows.



Legend

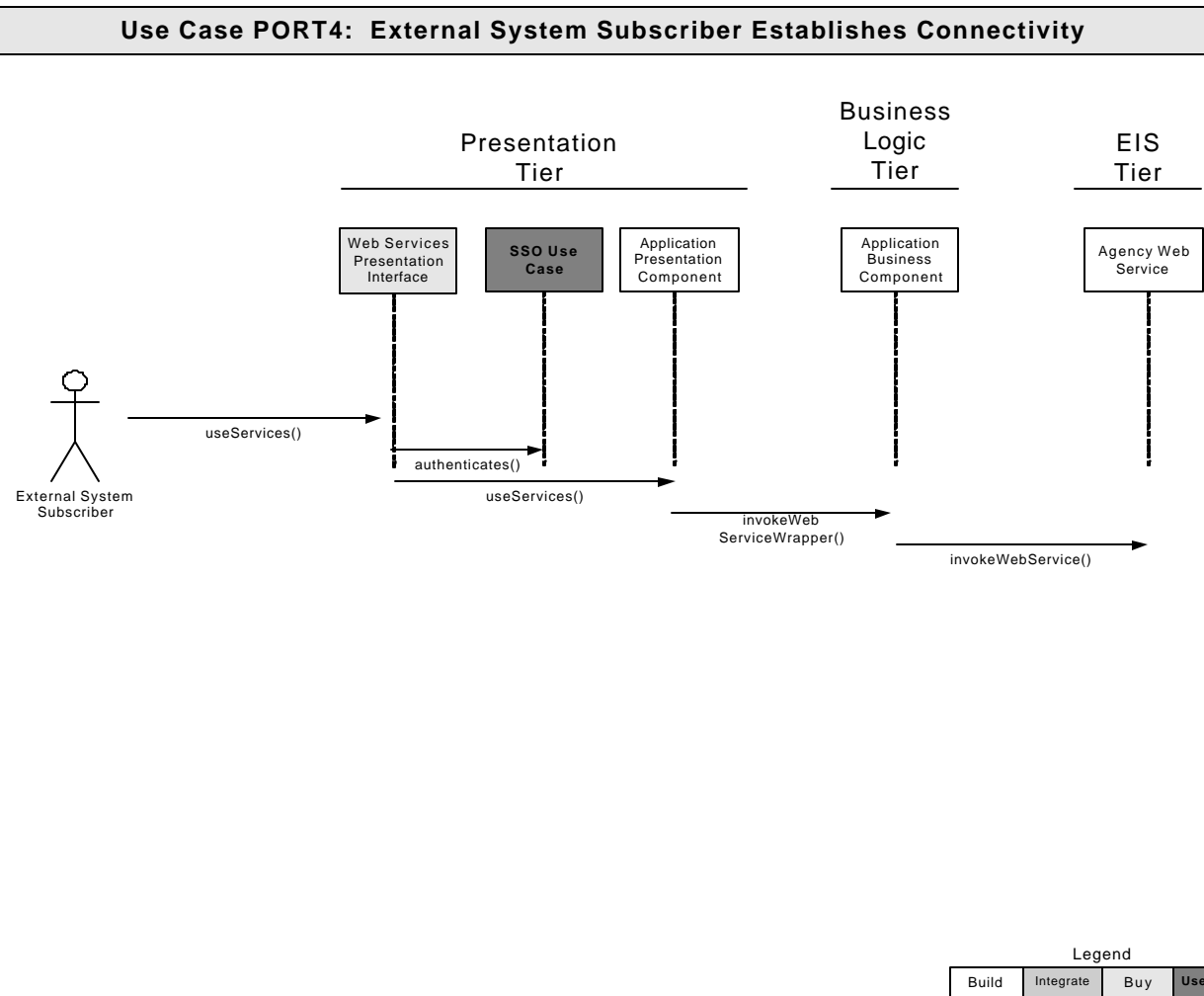
Build	Integrate	Buy	Use Case
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## PORT4

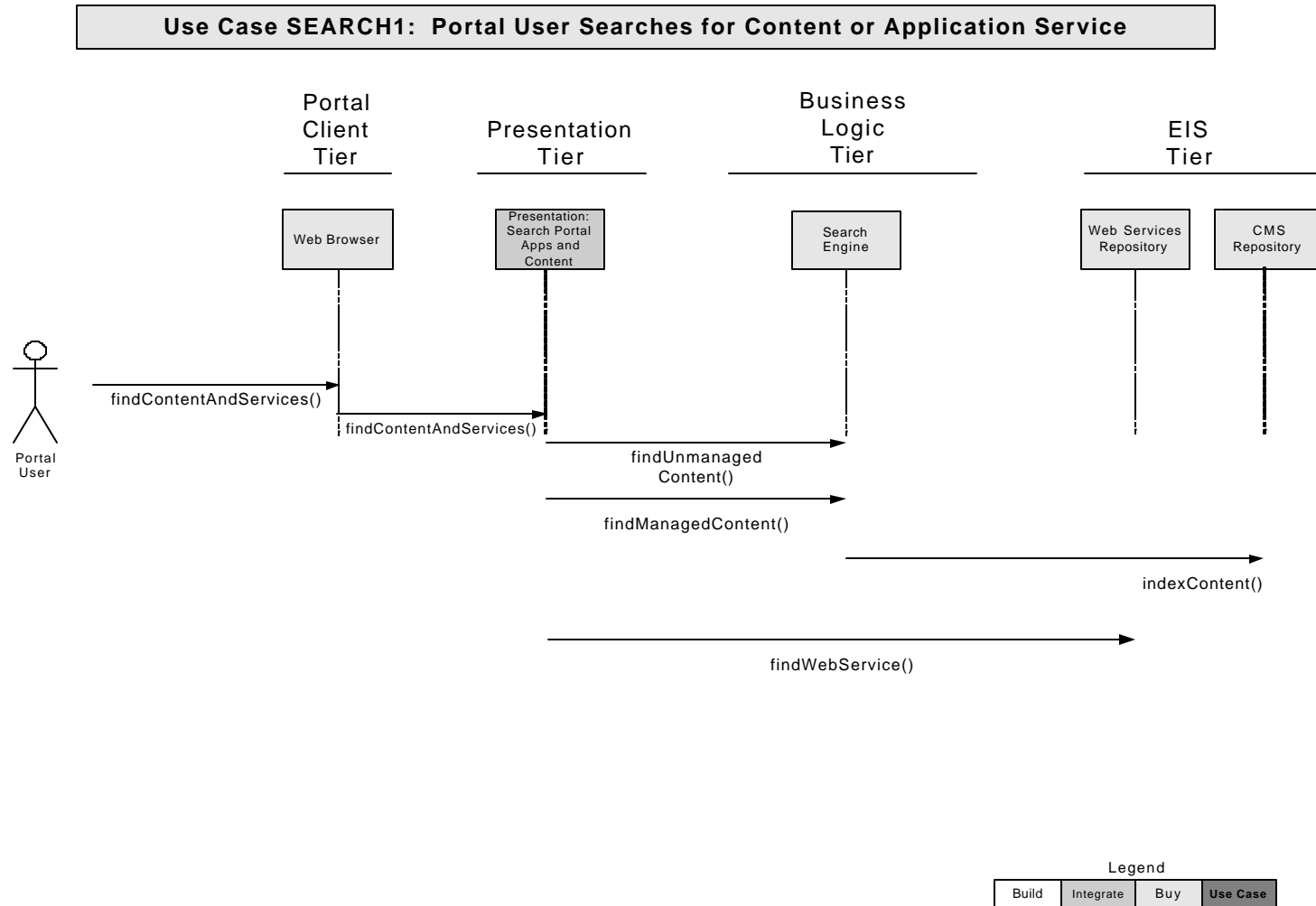
The PORT4 Use Case is shown in the illustration that follows.



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## SEARCH1

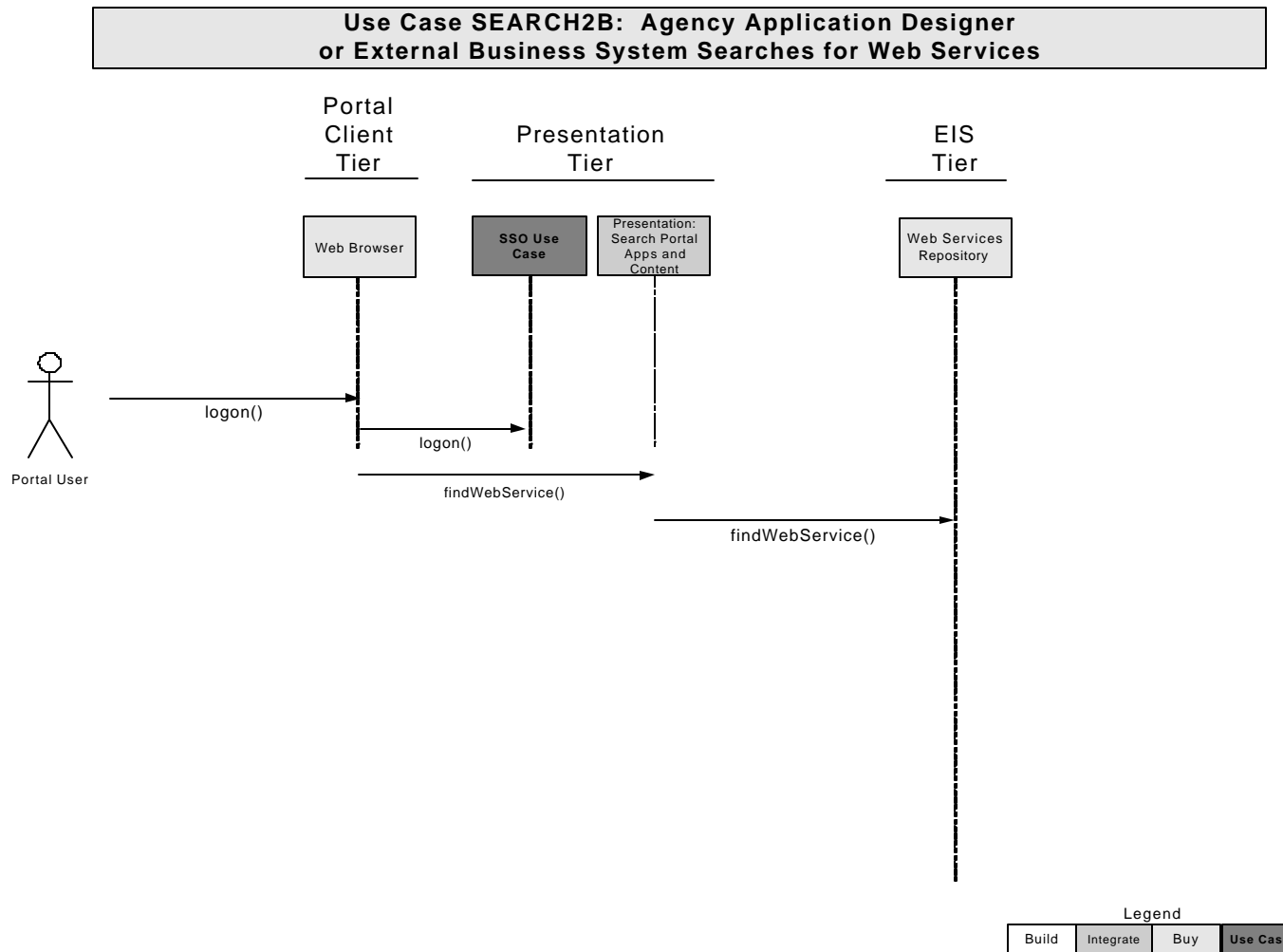
The SEARCH1 Use Case is shown in the illustration that follows.



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## SEARCH2B

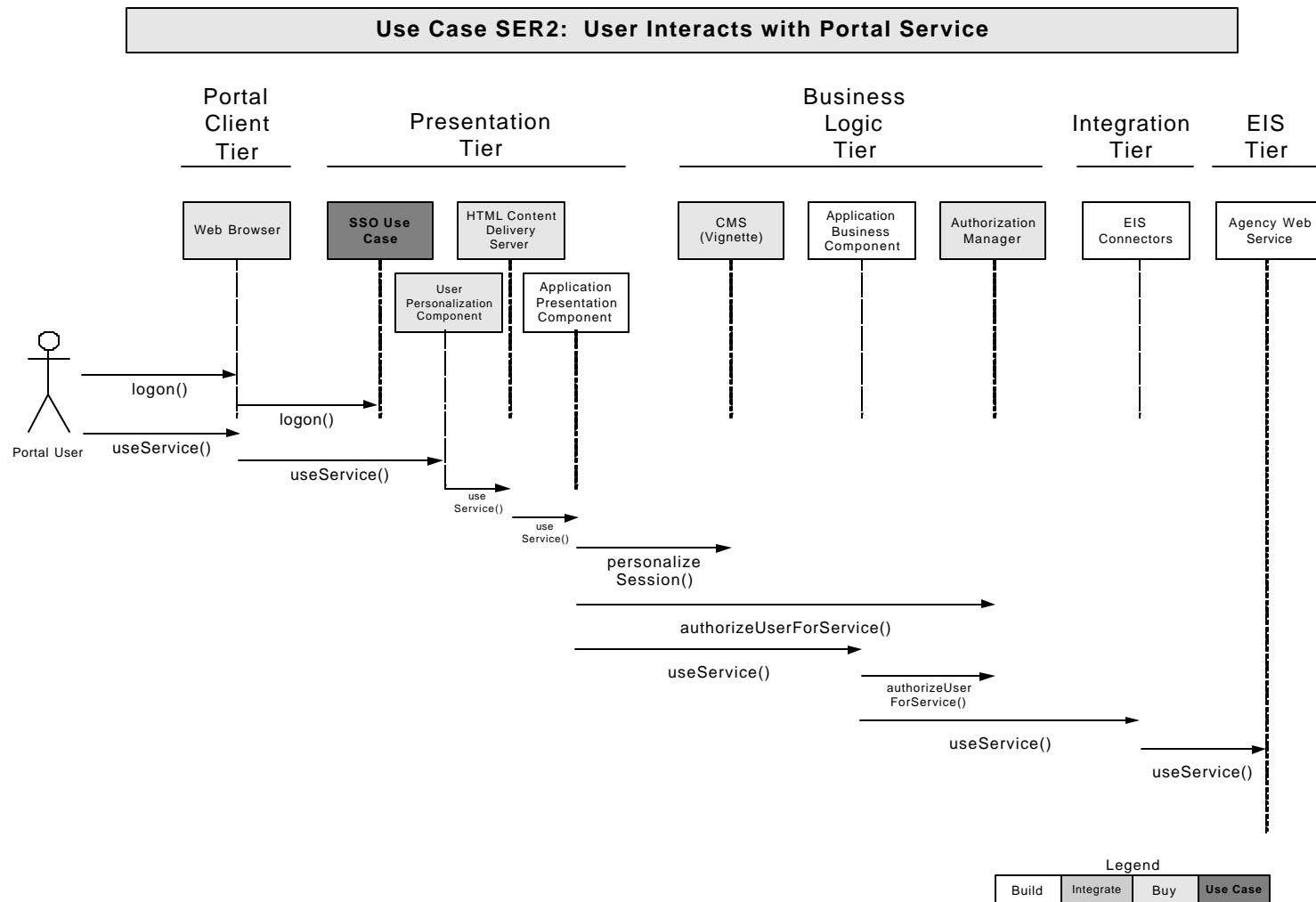
The SEARCH2B Use Case is shown in the illustration that follows.



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## SER2

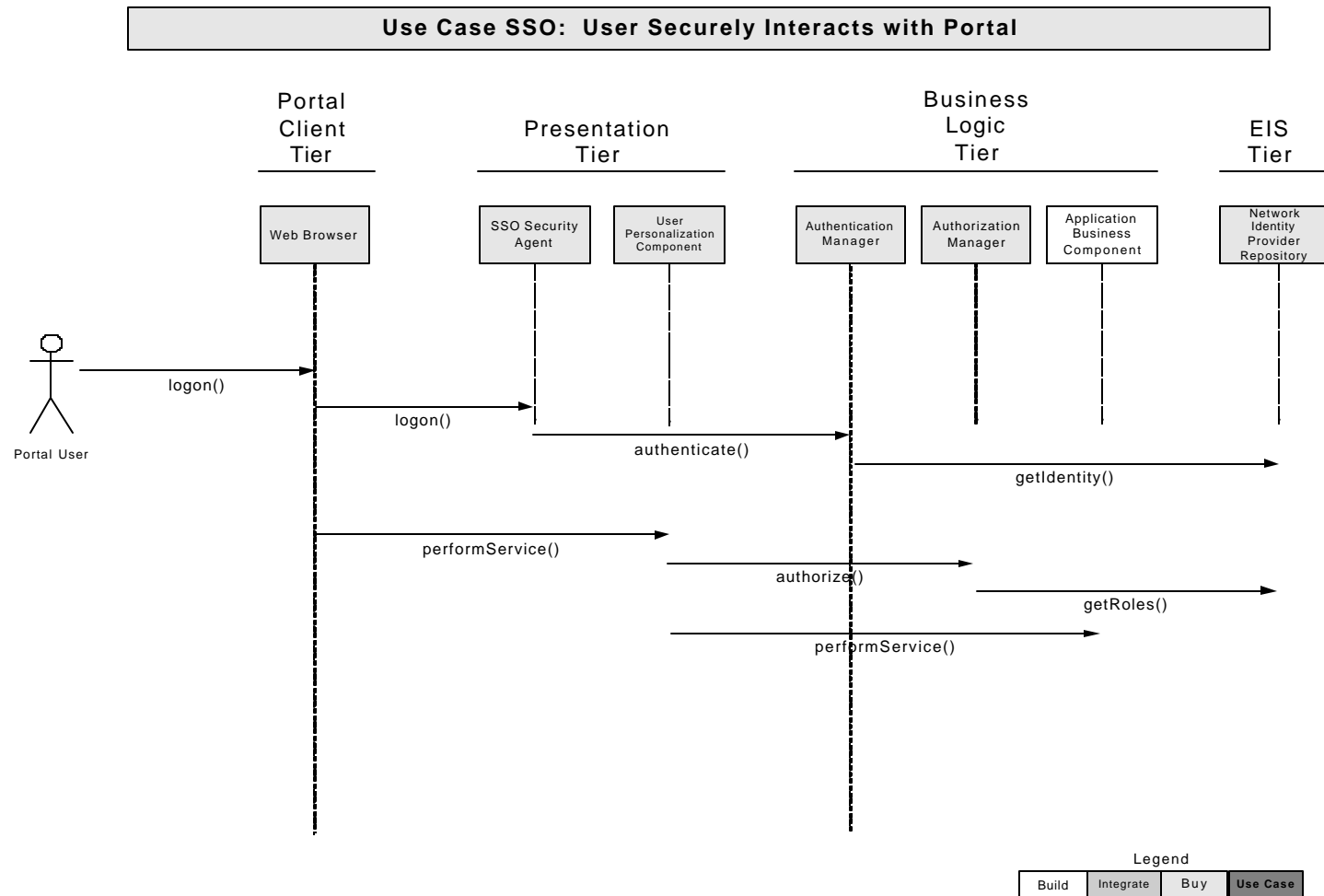
The SER2 Use Case is shown in the illustration that follows.



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## SSO

The SSO Use Case is shown in the illustration that follows.



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## **Configuration View**

The Configuration View maps the application components of the architecture to the Physical Overview.

This view presents each component (as defined in the Application Layer of the Distributed Platform Overview) and identifies the physical computing resource type (as defined in the Physical Overview) to which the component is deployed.

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### EPIA Architecture - Application Configuration View

